

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
28 April 2005 (28.04.2005)

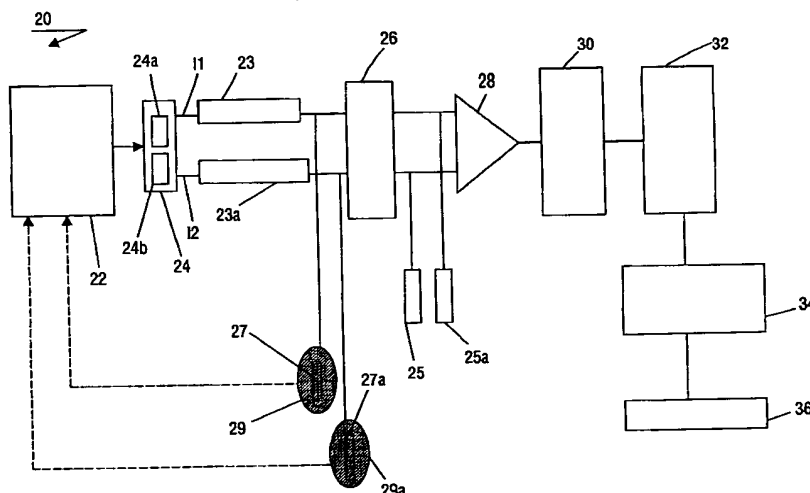
PCT

(10) International Publication Number  
**WO 2005/037099 A1**

- (51) International Patent Classification<sup>7</sup>: **A61B 5/0424**
- (21) International Application Number:  
PCT/IB2004/052007
- (22) International Filing Date: 7 October 2004 (07.10.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
03103845.8 17 October 2003 (17.10.2003) EP
- (71) Applicant (for AE, AG, AL, AM, AT, AU, AZ, BA, BB, BE, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CY, CZ, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, SZ, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW only): **KONINKLIJKE PHILIPS ELECTRONICS N.V.** [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **REITER, Harald** [DE/DE]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **MONTVAY, Andras** [DE/DE]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **LAUTER, Josef** [DE/DE]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **SUCH, Olaf** [DE/DE]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **SCHMIDT, Ralf** [DE/DE]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).
- (74) Agent: **GOLLA, Anke, L.**; Philips Intellectual Property & Standards, Weisshausstrasse 2, 52066 Aachen (DE).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,

[Continued on next page]

(54) Title: A DEVICE ARRANGED FOR CARRYING OUT A BIOELECTRICAL INTERACTION WITH AN INDIVIDUAL AND A METHOD FOR ON-DEMAND LEAD-OFF DETECTION



(57) Abstract: A device to carry out a bioelectrical interaction with an individual by means of electrodes 29, 29a whereby an on-demand verification of the integrity of the electrical contact of the electrodes is implemented. The device 20 comprises a control unit 22 arranged to determine an occurrence of the predefined event related to a quality of a measured signal. In case the predetermined event is detected, the control unit 22 actuates the testing means 24. The testing means is arranged to generate the test signals, 11,12 and to apply them via a coupling circuit 23, 23a to the electrodes. In case it is desired that cumulative information about the contact integrity is obtained, is it sufficient to apply a single test

signal per electrode. In case it is required to determine which of the electrodes has lost its contact, a sequence of test signals is generated by the sequencer 24b. The response signal from the electrodes 29, 29a is forwarded to the input filter 26, which is preferably also used for a normal signal analysis. The signal from the input filter 26 is directed via the input impedance 25, 25a to the input amplifier 28. The amplified response signal is forwarded to the signal processing means 30 which is arranged to analyze the response signal. Preferably, an amplitude analysis is done. The signal from the signal processing means 30 is supplied to the analog-to-digital converter (ADC) 32 after which a digital processing of the response signal is carried out by means of a further processing unit 34. In case the further processing unit 34 determines that the integrity of the contact is below the allowable level, the lead-off indicator 36 is actuated.



KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— with international search report

(84) **Designated States** (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.